Waste Area Group 1
Record of Decision

Part II – Decision Summary

1. SITE NAME, LOCATION, AND DESCRIPTION

The Idaho National Engineering and Environmental Laboratory (INEEL) is a U.S. Department of Energy (DOE) facility located in southeastern Idaho, 51.5 km (32 mi) west of Idaho Falls (Figure 1-1). The laboratory encompasses approximately 2,305 km^2 (890 mi^2) of the northeastern portion of the Eastern Snake River Plain and extends across portions of five Idaho counties: Butte, Jefferson, Bonneville, Clark, and Bingham.

Current land use at the INEEL is primarily for nuclear research, development, and waste management. The perimeter area of the INEEL is leased for cattle and sheep grazing under the management of the U.S. Bureau of Land Management. The perimeter area functions as a controlled safety-and-security buffer between INEEL activities and the general public. No grazing takes place within 0.8 km (0.5 mi) of any facility boundaries. Controlled hunting is permitted on INEEL land, but is restricted to the 0.8 km (0.5 mi) strip just inside the site boundary.

State Highways 22, 28, and 33 cross the northeastern portion of the INEEL and U.S. Highways 20 and 26 cross the southern portion. Except for public travel on the highways, access to the INEEL is controlled by fences and security personnel.

The INEEL has a cool desert climate. Summers are mild and dry with normal temperatures ranging from 10 to 31°C (50 to 88°F), while winter temperatures range from -16 to 2°C (3 to 28°F). Annual precipitation averages are 23 cm (9.1 in.).

The Snake River Plain Aquifer (SRPA), the largest potable aquifer in Idaho, underlies the Eastern Snake River Plain. The aquifer covers an area of approximately 24,853 km^2 (9,600 mi^2). Approximately 9% of the aquifer's area is below the INEEL. The depth to the aquifer varies from approximately 61 m (200 ft) below Test Area North (TAN) to approximately 274 m (900 ft) on the southwest edge of the INEEL.

More than 400 plant species, 190 bird species, and 40 mammal species have been identified on the INEEL. Several bird species at the INEEL warrant attention because of sensitivity to disturbance or their threatened status, including the ferruginous hawk (*Buteo regalis*), bald eagle (*Haliaeetus leucocephalus*), long-billed curlew (*Numenius americanus*), and the loggerhead shrike (*Lanius Ludovicianus*). In addition, the Townsend's big-eared bat (*Plecotus Townendii*) and pygmy rabbit (*Brachylagus Idahoensis*) are listed by the U.S. Fish and Wildlife Service as candidates for consideration as threatened or endangered species. The ringneck snake (*Diadophis punctatus*), whose occurrence is considered to be INEEL-wide, is listed by the Idaho Department of Fish and Game as a Category C sensitive species.

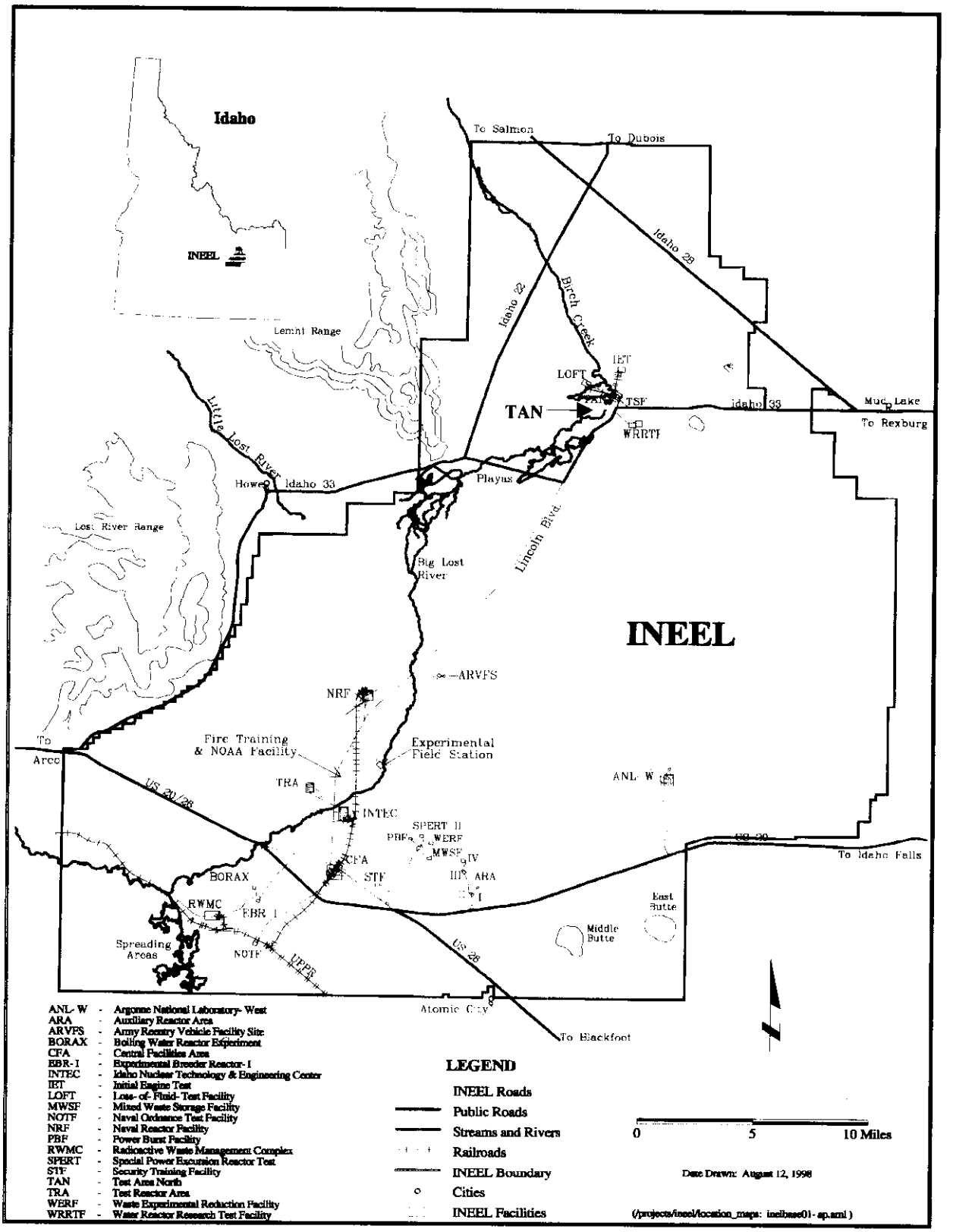

Figure 1-1. Location of Test Area North at the Idaho National Environmental and Engineering Laboratory.

The INEEL lies within the lands traditionally occupied by the Shoshone-Bannock Tribes. The tribes used the land and waters within and surrounding the INEEL for fishing, hunting, and plant gathering, in addition to medicinal, religious, ceremonial, and other cultural uses. Under the cooperative *Agreement-in-Principle between the Shoshone-Bannock Tribes and the U.S. Department of Energy* (DOE 1998) some tribal activities continue today within the INEEL boundaries.

The TAN area is approximately 41-ha (102-acre), located in the north-central portion of the INEEL (see Figure 1-1). The area includes four different facilities: (1) the TAN Technical Support Facility (TSF), (2) the Initial Engine Test Facility (IET), (3) the Water Reactor Research Test Facility (WRRTF), and (4) Specific Manufacturing Capability (SMC)/Loss-of-Fluid Test (LOFT) Facility. Figure 1-2 shows the locations of the TAN facilities.

Since the INEEL is a DOE facility, any National Environmental Policy Act (NEPA) issues that affect the sites identified in this Record of Decision (ROD) will be addressed in the Storm Water Pollution Prevention Plan, the Environmental Checklist, and other appropriate post-ROD documents.

1.1 Future Land Use

The INEEL is expected to remain under government management and control for at least the next 100 years. Regardless of the future use of land now occupied by the INEEL, the federal government has an obligation to provide adequate institutional controls (i.e., limit access) to areas that pose a significant health and/or safety risk to the public and workers until that risk diminishes to an acceptable level for the intended purpose. Achievement of this obligation hinges on continued Congressional appropriation of sufficient funds to the responsible government entity charged to maintain the institutional controls for as long as necessary and as long as the federal government of the United States remains viable.

Facility and land use at the INEEL have been projected for 100 years into the future. The projections, or "scenarios," illustrate the type and extent of operations the INEEL and its stakeholders find acceptable. No changes to the present INEEL boundaries are expected within the 100-year period. Most of the developed areas of the Site are projected to remain industrial. Grazing will continue in the buffer area, but no residential development (i.e., housing) will be allowed within INEEL boundaries. No major new private development (residential or nonresidential) adjacent to the Site is expected for at least 25 to 50 years.

The scenarios developed for the INEEL are illustrated in the *Long-Term Land Use Future Scenarios for the Idaho National Engineering Laboratory* (U.S. Department of Energy Idaho Operations Office [DOE-ID] 1995a) report. Planners at the INEEL use this and two other documents, the Idaho National Engineering and Environmental Laboratory *Comprehensive Facility and Land Use Plan* (DOE-ID 1997a) and the *Idaho National Engineering and Environmental Laboratory Environmental Management End State Planning Document* (INEEL 1998a), to guide their decisions about INEEL land and facility use.

Unless the U.S. resumes former levels of defense-related activities, plans for TAN are to complete current programs, deactivate all facilities, and finish environmental restoration. Some facilities currently supporting area programs will be redirected to support deactivation and environmental restoration activities. The WRRTF area is scheduled for a major rehabilitation to support ongoing research and development activities, and is expected to be operational for another 20 years.

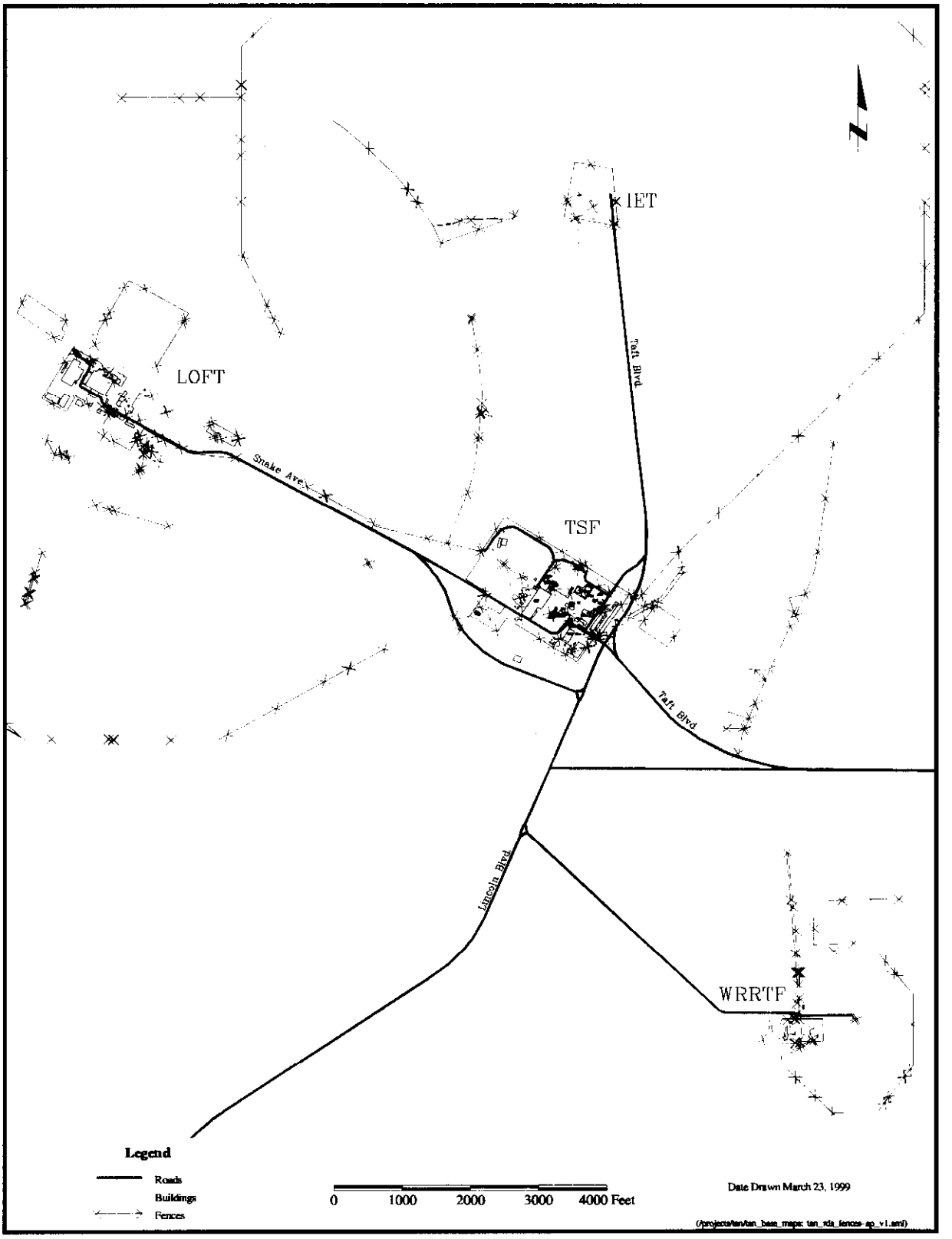

Figure 1-2. Locations of major facilities within TAN.

The facilities at TAN are nearing the end of their life cycles and will not be required for the INEEL's future missions. Other than construction of short-term support facilities for current operations at TAN, development of nuclear facilities is considered to be unlikely. The 25-year scenario (1994–2019) anticipates decontamination and dismantlement (D&D) of selected facilities at TAN. By 2044 (the 50-year scenario), the useful life of TAN will be completed. The D&D of the remaining facilities will commence. The Aircraft Nuclear Propulsion Program Hanger (Building TAN-629) will likely be maintained as a National Historical Monument.

By 2094 (the 100-year scenario), TAN will be an established industrial development area. However, because of the technical difficulty of remediating contaminants in the groundwater plume underneath TAN, institutional controls that include fences, warning markers, and property transfer documentation are likely to remain in place beyond the 100-year scenario.

2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 Site History

The INEEL was established in 1949 as the National Reactor Testing Station by the U.S. Atomic Energy Commission (AEC) for nuclear energy research and related activities. It was redesignated the Idaho National Engineering Laboratory in 1974 and the INEEL in 1997 to reflect the expansion of its mission to include a broader range of engineering and environmental management activities.

Test Area North was constructed between 1954 and 1961 to support the Aircraft Nuclear Propulsion Program. The program's objectives were to develop and test designs for nuclear-powered aircraft engines. Upon termination of this research in 1961, the area's facilities were converted to support a variety of other DOE research projects.

From 1962 through the 1970s, the area supported reactor safety testing and behavior studies at the Loss-of-Fluid Test (LOFT) Facility. Beginning in 1980, the area was used to conduct work with material from the 1979 Three Mile Island reactor accident. Current activities include the manufacture of armor for military vehicles at the SMC, nuclear inspection, and storage operations at the IET, TSF, and WRRTF.

2.2 Enforcement Activities

In July 1987, a Consent Order and Compliance Agreement (COCA) was signed by the DOE, the U.S. Environmental Protection Agency (EPA), and the U.S. Geological Survey (USGS). Under the COCA, 32 sites were evaluated, including the groundwater contamination at TAN and three injection wells.

In November 1989, the EPA placed the INEEL on the National Priorities List of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (54 Federal Register [FR] 48184). A Federal Facility Agreement and Consent Order (FFA/CO) and Action Plan was signed in 1991 by the Agencies, which superseded the COCA. The FFA/CO established the procedural framework and schedule for developing, prioritizing, implementing, and monitoring response actions at the INEEL in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), and the Idaho Hazardous Waste Management Act (HWMA).

To better manage cleanup activities, the INEEL was divided into 10 waste area groups (WAGs); TAN is designated as WAG 1. The FFA/CO also established 10 operable units (OUs) within the TAN complex and identified 79 potential release sites for study. An additional 15 sites were identified at TAN subsequent to the signing of the FFA/CO, bringing the total number of release sites requiring investigation to 94.

The TAN groundwater contamination and 31 other sites that were evaluated with it were addressed under the OU 1-07A interim action to reduce the contamination near the TSF-05 injection well and in the surrounding groundwater. The results of this investigation were presented in the August 1995 *Record of Decision for the Technical Support Facility Injection Well (TSF-05) and Surrounding Groundwater Contamination (TSF-23) and Miscellaneous No Action Sites Final Remedial Action* (DOE-ID 1995b), which finalized the remedial action for the TAN groundwater contamination. Thirty of the 32 sites were identified as "No Action" sites. Cleanup activities at the other two sites are on track to meet the remedial action objectives (RAOs) identified in that ROD.

The remaining 62 potential release sites at TAN were examined under OU 1-10 comprehensive remedial investigation (RI)/feasibility study (FS) (DOE-ID 1997b), which culminates in this ROD. Of these sites, 53 were determined not to require cleanup activities (see Table 1-1 of the comprehensive RI/FS). Eight sites may present an imminent and substantial endangerment to human health and the environment and require remedial action. One site, the Mercury Spill Area (TSF-08), was selected for a treatability study that will be conducted by WAG 10. If necessary, TSF-08 will be remediated under WAG 1 based on the results of the treatability study. The Agencies will determine the appropriate response action to be taken in accordance with the FFA/CO and this ROD.

A Proposed Plan (DOE-ID 1998a) describing the results of the comprehensive RI/FS (DOE-ID 1997b) was released in February 1998 to identify the Agencies' preferred alternative for the eight sites and the Mercury Spill Area. In response to public comments on both the overall readability of the plan and specific technical issues raised within it, the plan was revised and an FS Supplement was prepared to support the revisions. A revised Proposed Plan (DOE-ID 1998b) and an OU 1-10 FS Supplement (DOE-ID 1998c) were issued in November 1998.

2.3 Reference Materials

A ROD provides the public with a summary of information about the site and the decisions made regarding it. The decisions made in this ROD are primarily based on the following documents, which can be found in the Administrative Record:

General Documents

- *Agreement-in-Principle between the Shoshone-Bannock Tribes and the U.S. Department of Energy* (DOE 1998)
- *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991)
- *Idaho National Engineering and Environmental Laboratory Comprehensive Facility and Land Use Plan* (DOE-ID 1997a)
- *Idaho National Engineering and Environmental Laboratory Environmental Management End State Planning Document* (INEEL 1998a)
- *Long-Term Land Use Future Scenarios for the Idaho National Engineering Laboratory* (DOE-ID 1995a)
- *Preliminary Scoping Track 2 Summary Report for TAN OU 1-05 Radioactive Contamination Sites* (INEL 1994)
- *Health Effects Assessment Summary Tables: Annual FY-1994* (EPA 1994)
- *Administrative Record File Index* (Appendix B)

WAG 1 Documents

- *Comprehensive Remedial Investigation/Feasibility Study for the Test Area North Operable Unit 1-10 at the Idaho National Engineering and Environmental Laboratory* (Comprehensive RI/FS) (DOE-ID 1997b)

- *Comprehensive Remedial Investigation/Feasibility Study Supplement for Test Area North Operable Unit 1-10 at the Idaho National Engineering and Environmental Laboratory* (FS Supplement) (DOE-ID 1998c)

- *Record of Decision for the Technical Support Facility Injection Well (TSF-05) and Surrounding Groundwater Contamination (TSF-23) and Miscellaneous No Action Sites Final Remedial Action* (DOE-ID 1995b).

3. HIGHLIGHTS OF COMMUNITY PARTICIPATION

In accordance with CERCLA §113(k)(2)(B)(i-v) and §117, opportunities for public information and participation in the WAG 1 RI and decision process were provided from December 1995 through January 1999. The INEEL Community Relations Plan was used as a guidance document during the course of the OU 1-10 investigation for outlining public involvement activities. Those opportunities included:

- A "kick-off" fact sheet released in December 1995
- Media briefings for reporters from across Idaho
- Regular reports about the investigation in bimonthly issues of the *INEEL Reporter* (an Environmental Restoration Program newsletter mailed to more than 6,000 individuals on the INEEL mailing list)
- Advertisements and announcements in regional newspapers and radio news programs
- The Proposed Plan
- Updated Fact Sheet
- Revised Proposed Plan
- Focus group comprising members of the public
- Briefings and presentations to interested groups
- Public meetings.

The "kick-off" fact sheet on the WAG 1 comprehensive RI/FS was sent to approximately 6,200 members of the public and 340 INEEL employees. The fact sheet offered technical briefings and included a postage-paid return mailer comment form. The fact sheet was the initial opportunity for the public to be involved in the TAN comprehensive RI process. No briefings were requested, but comments were received from two members of the public. These comments were evaluated and considered during preparation of the project work plan.

Media briefings for reporters from Idaho Falls, Pocatello, Twin Falls, and Boise, in September and October 1997, resulted in local newspaper articles and a story distributed nationally by the Associated Press. The investigation was also highlighted in four national industry publications—*Defense Cleanup*, *Superfund Week*, *Inside Energy*, and *Weapons Complex Monitor*—and several area radio talk/news shows.

Briefings about the TAN investigation were presented to the INEEL Citizens Advisory Board (CAB) in March, May, September, and November 1998, and January 1999. The CAB is the federally chartered Environmental Management Site-Specific Advisory Board for the INEEL. Members of the general public are invited to attend the CAB meetings and provide input.

Briefings were also provided, by request, to several stakeholder groups, including the Environmental Defense Institute, Coalition 21, the Shoshone-Bannock Tribal Council, and University of Idaho students.

In February 1998, the DOE-ID issued a news release to more than 100 media contacts, announcing a 30-day public comment period and public meetings for the TAN Proposed Plan. Advertisements announcing the same information appeared in six regional newspapers: the *Post Register* (Idaho Falls), the *Idaho Statesman* (Boise), the *Sho-Ban News* (Fort Hall), the *Idaho State Journal* (Pocatello), the *Times News* (Twin Falls), and the *Daily News* (Moscow).

The news release resulted in short notes in community calendar sections of newspapers and in public service announcements on radio stations. The news release and advertisements also announced the availability of TAN investigation documents in the Administrative Record section of the INEEL Information Repositories located in the INEEL Technical Library in Idaho Falls and in public libraries in Fort Hall and Moscow (the Fort Hall Information Repository was moved to Boise in September 1998). Additionally, a postcard was mailed to approximately 6,200 citizens on the INEEL mailing list announcing the availability of the Proposed Plan, the comment period, and public meetings.

In February 1998, the Proposed Plan was mailed to about 700 members of the public on the INEEL mailing list, urging them to attend the public meetings and to provide input. Public meetings were held in Idaho Falls on February 23, Boise on February 24, and Moscow on February 26, 1998. Comment forms were included in the Proposed Plan and were available at the meetings for submitting written comments either at the meeting or by mail. The reverse side of the meeting agenda contained a form for the public to use in evaluating the effectiveness of the meeting. A court reporter was present at each meeting to prepare transcripts of discussions and public comments. The meeting transcripts were placed in the Administrative Record section for the WAG 1, TAN, OU 1-10 in the INEEL Information Repositories. More than 20 members of the public, not associated with the project, attended the public meetings.

The comment period began February 16; a 30-day extension requested by a member of the public extended the public comment period to April 17, 1998. News releases, advertisements, and postcards also were issued to announce the comment period extension.

Public comments received on the Proposed Plan (including a recommendation from the INEEL CAB) raised concerns about the readability, organization, and clarity of the Proposed Plan, as well as several technical questions. In response to the comments, the FS and Proposed Plan were reexamined to address the technical questions and a focus group comprising 10 members of the public from around the state was convened to solicit public input on improving this and other INEEL proposed plans. The Proposed Plan was revised to incorporate changes that were required because of these issues.

An updated fact sheet was released in November 1998 along with the OU 1-10 FS Supplement and the revised Proposed Plan. The public comment period for the revised plan began November 23 and, due to a 30-day extension requested by a member of the public, ended January 21, 1999. News releases, advertisements, and postcards announced the availability of the revised plan, the new comment period, and the comment period extension.

All comments received on both versions of the Proposed Plan (each released with separate public comment periods) were considered during the development of this ROD and are included in the Responsiveness Summary (Part III) and the Administrative Record. The decision for this action is based on the information in the Administrative Record for this OU. The Administrative Records are available to the public at the following locations.

INEEL Technical Library
DOE Public Reading Room
1776 Science Center Drive
Idaho Falls, ID 83415
(208) 526-1185

Albertsons Library
Boise State University
1910 University Drive
Boise, ID 83725
(208) 385-1621

University of Idaho Library
University of Idaho Campus
434 2nd Street
Moscow, ID 83843
(208) 885-6344

and on the Internet (**http://ar.inel.gov/home.html**).

The Responsiveness Summary (Part III) was prepared as part of this ROD. All formal oral comments, as given at the public meetings, and all written comments, as submitted, are presented verbatim in the Responsiveness Summary and in the Administrative Record for the ROD. The comments are annotated to indicate which response in the Responsiveness Summary addresses each comment. Appendix A provides a scanned copy of the actual written comment as submitted. Appendix B provides the Administrative Record File Index.

4. SCOPE AND ROLE OF OPERABLE UNITS AND RESPONSE ACTIONS

Waste Area Group 1 includes the TSF, IET, LOFT, SMC, and WRRTF fenced areas, as well as the immediate areas outside the fence lines. Potential release sites addressed at the TSF include: tanks, spills, disposal sites, and wastewater disposal systems (e.g., sumps, tanks, an injection well, ponds, and lagoons). The IET potential release sites investigated include: tanks, an injection well, and rubble disposal sites. Potential release sites investigated at LOFT and SMC include: pits, tanks, a wastewater disposal pond, and two small historic spill sites. The WRRTF sites investigated include: tanks, a wastewater pond, an injection well, a burn pit, a sewage lagoon, and petroleum contaminated soil.

Since 1991, 94 potential release sites have been studied at TAN. This includes 79 sites originally identified in the FFA/CO (DOE-ID 1991), plus 15 additional sites identified during the comprehensive RI/FS. Thirty-two sites were addressed in the August 1995 *Record of Decision, Declaration for the Technical Support Facility Injection Well (TSF-05) and Surrounding Groundwater Contamination (TSF-23) and Miscellaneous No Action Sites Final Remedial Action* (DOE-ID 1995b). This is the final ROD for the sites that were investigated under OU 1-10, and evaluates institutional controls for all sites at WAG 1, including the OU 1-07B ROD "No Action" sites, where an unacceptable risk for unrestricted land use remains.

The 62 potential release sites under OU 1-10 were examined in the comprehensive RI/FS leading to this ROD. Monitoring data, process knowledge, written correspondence, interviews with current and previous employees, previous agency investigations and decisions, and site characterization data were used to determine the nature and extent of contamination at each site and to evaluate potential risks to human health and the environment.

The task of the OU 1-10, the comprehensive RI/FS (DOE-ID 1997b), is to evaluate contamination of environmental media (soil, air, and groundwater) and the potential risks to human health and the environment from exposure to the media. In addition, risk produced through the air and groundwater exposure pathways is evaluated cumulatively. A cumulative analysis of these two exposure pathways involves calculating one WAG-wide risk number for each contaminant of potential concern (COPC) in each air and groundwater exposure route. Analyzing the air and groundwater pathways cumulatively is necessary because release sites within a WAG are typically isolated from one another with respect to the soil pathway exposure routes. Therefore, the soil pathway exposure route is analyzed on a release-site specific or noncumulative basis.

Of the 94 potential release sites in WAG 1, 83 were determined not to pose an imminent and substantial endangerment to human health and the environment, based on a residential scenario. The sites, classified as "No Action" or "No Further Action" are listed in Table 4-1. Explanation of "No Action" and "No Further Action," site status information and the rationale for the "No Action" or "No Further Action" determination can be found in Section 12. More detailed information about these sites can also be found in the comprehensive RI/FS. Of these 83 sites at WAG 1, 76 are "No Action" and seven (plus three subareas of TSF-06) are "No Further Action." Approval of this ROD will formalize the "No Action" and "No Further Action" decision (see Table 4-1).

Two sites, LOFT-02 (the LOFT Disposal Pond) and WRRTF-03 (the WRRTF Evaporation Pond [TAN-762]), did not pose a risk threat to human health but ecological risks were greater than threshold levels. The LOFT-02 and WRRTF-03 sites are "No Action" sites. Ecological risks at these two sites will

Table 4-1. The WAG 1 sites recommended for "No Action" and "No Further Action."

OU	"No Action"	"No Further Action"	Site Code	Site Name
1-01	X		IET-05	IET Foam Stabilizer Tank
	X		IET-06	IET Injection Well (TAN-332)
	X		LOFT-03	LOFT Rubble Pit South of LOFT Disposal Pond
	X		LOFT-07	LOFT Foam Solution Tank (TAN-119)
	X		LOFT-11	LOFT Cryogen Pits (3) East of TAN-629
	X		LOFT-14	LOFT Asbestos Piping
	X		LOFT-15	LOFT Buried Asbestos Pit
	X		TSF-01	TSF Diesel Tank West of TAN-607 and Fuel Spill
	X		TSF-04	TSF Gravel Pit/Acid Pit
	X		TSF-11	TSF Three Clarifier Pits East of TAN-604
		X	TSF-39	TSF Transite (Asbestos) Contamination
		X	TSF-42	TAN-607-A Room 161 Contaminated Pipe
		X	TSF-43	Radioactive Parts Security Storage Area (RPSSA) Buildings 647/648 and Pads
1-02	X		IET-01	IET Gasoline Storage Tank
	X		IET-09	IET Lube Oil Tank
	X		IET-10	IET Diesel Fuel Tank
	X		IET-11	IET Heating Oil Tank
	X		LOFT-05	LOFT Two Fuel Tanks
	X		LOFT-06	LOFT Slop Tank East of TAN-631
	X		LOFT-08	LOFT Tank in Borrow Pits
	X		TSF-13	TSF Gasoline Tank North of TAN-610
	X		TSF-14	TSF Fuel Oil Tank Northwest of TAN-603
	X		TSF-15	TSF Fuel Tank West of TAN-603
	X		TSF-24	TSF Fuel Oil Tank Under Southwest Corner of TAN-607
	X		TSF-25	TSF Oil Sumps East of TAN-609
	X		TSF-32	TSF Oil Tank South of TAN-601
	X		TSF-33	TSF T-11 Fuel Tank East of TAN-602
	X		WRRTF-09	WRRTF Diesel Fuel Tank
	X		WRRTF-10	WRRTF Gasoline Tank
	X		WRRTF-12	WRRTF Diesel Fuel Tank
1-03	X		TSF-02	TSF Service Station Spill (TAN-664)
	X		TSF-38	TSF Bottle Site
1-04	X		LOFT-02	LOFT Disposal Pond

Table 4-1. (continued).

OU	"No Action"	"No Further Action"	Site Code	Site Name
	X		TSF-12	TSF Acid Neutralization Sump North of TAN-602
	X		TSF-17	TSF Two Neutralization Pits North of TAN-649
	X		TSF-19	TSF Caustics Tank V-4 South of TAN-616
	X		TSF-20	TSF Two Neutralization Pits North of TAN-607
		X	TSF-29	TSF Acid Pond (TAN-735)
	X		TSF-31	TSF Acid Pit West of TAN-647
1-05		X	IET-04	IET Stack Rubble Site
	X		IET-07	IET Hot Waste Tank (TAN-319)
		X	TSF-10	TSF Drainage Pond (TAN-782)
	X		TSF-21	TSF IET Valve Pit
	X		WRRTF-04	WRRTF Radioactive Liquid Waste Tank
1-06	X		LOFT-01	LOFT Diesel Fuel Spills
	X		LOFT-10	LOFT Sulfuric Acid Spill
1-08	X		TSF-22	TSF Railroad Turntable
		X	TSF-28	TSF Sewage Treatment Plant (TAN-623) and Sludge Drying Beds
	X		WRRTF-05	WRRTF Injection Well (TAN-331)
1-09	X		TSF-36	TAN-603 French Drain
	X		TSF-37	TSF Contaminated Well Water Spill
	X		WRRTF-02	WRRTF Two-Phase Pond
	X		WRRTF-03	WRRTF Evaporation Pond
	X		WRRTF-06	WRRTF Sewage Lagoon
1-10[a]	X		TSF-27	TSF Paint Shop Floor Drain Leach Field (West of TAN-636)
New sites	X		LOFT-16	LOFT Landfill Northeast of LOFT-02 Drainage Pond
	X		LOFT-12	LOFT North Transformer Yard Polychlorinated Biphenyl (PCB) Spill and Soil Site
	X		TSF-44	TSF Diesel Fuel Pipeline Leak Northwest of TAN-604
	X		None	IET Pond and Ditch West of IET
	X		None	IET Gravel Pit
	X		None	IET Burn Pit East of IET
	X		None	LOFT Burn Pit Northwest of LOFT
	X		None	TSF Burn Pit II Southwest of the TSF-05 Injection Well

Table 4-1. (continued).

OU	"No Action"	"No Further Action"	Site Code	Site Name
	X		None	TSF Radioactive Spills on Bear Boulevard West of TAN-607
	X		None	Radioactive Spill 1 mile South of TAN on Lincoln Boulevard.
	X		None	Sand Piles South of TSF and Southwest of WRRTF
	X		None	WRRTF Transite Area
	X		None	Broken Pipe in Berm East of TAN-633
	X		None	Buried Asbestos behind the Hanger at SMC
None	X		IET-02	IET Burial Pit Northeast of IET
	X		IET-08	IET Septic Tank (TAN-710) and Filter Bed
	X		LOFT-04	LOFT Injection Well (TAN-733)
	X		LOFT-09	LOFT Septic Tank and Drainfield (TAN-762)
	X		LOFT-13	LOFT Dry Well (TAN-333)
	X		SMC-01	SMC Septic Tank and Drainfield (TAN-629)
	X		TSF-16	TSF Brine Pit North of TAN-608
	X		TSF-30	TSF Septic Tank East of TAN-602
	X		TSF-34	Fuel Tank South of TAN-607
	X		TSF-35	Acid Sump Southeast of TAN-609
	X		TSF-40	Rubble Pile near TAN
	X		TSF-41	Scrap Yard South
	X		TSF-45	AEC Burial Pit
	X		WRRTF-07	WRRTF Septic Tank and Sand Filters (TAN-737)
			None[b]	TAN-616 Evaporator Pit and Associated Releases

a. It has been agreed to by the DOE-ID and the State of Idaho Department of Health and Welfare that an action taken by CERCLA will close out the land disposal unit identified in the FFA/CO.

b. This site has been included under the new site identification per the FFA/CO and will be evaluated per the FFA/CO guidelines. However, this site was not evaluated in the OU 1-10 RI/FS.

be investigated as part of the OU 10-04 site-wide ecological risk assessment (ERA). If it is determined that remedial action is required at these sites, the action will be performed and documented under WAG 1 and a separate decision.

One site, TSF-08 (the Mercury Spill Area), was selected for a treatability study using phytoremediation. Unacceptable risk to human health could occur in a future residential use scenario through gardening and ingestion of mercury contaminated crops. The treatability study will be performed by WAG 10 to determine mercury uptake factors and rates by plants. A revised risk analysis will be conducted using this site specific data. Based on the results of this study, a determination will be made as to subsequent action, if required. If remedial action is required at this site, the action will be performed

and documented by WAG 1. The Agencies will determine the appropriate response action to be taken, if required, in accordance with the FFA/CO and this ROD.

Eight sites may pose an imminent and substantial endangerment to human health and the environment if they are not remediated (see Table 4-2). The purpose of this response is to prevent current or future exposure to the contaminants at these sites. For this ROD, the eight sites have been placed in three groups on the basis of similarities in contamination. The groups include the following:

- Tank Sites—The Intermediate-Level (Radioactive) Waste Disposal System (TSF-09) and the Contaminated Tank Southeast of Tank V-3 (TSF-18) (collectively, the "V-Tanks"), and the PM-2A Tanks (TSF-26). These tanks will be cleaned during the CERCLA remedial action, as a best management practice.

- Radionuclide-Contaminated Soil Sites—The TAN/TSF-1 Area (Soil Area) ("Soil Contamination Area South of the Turntable") (TSF-06, Area B) and the TSF Disposal Pond (TSF-07).

- Nonradionuclide-Contaminated Soil Sites—The TSF Burn Pit (TSF-03) and the WRRTF Burn Pits (I, II, III, and IV) (WRRTF-01) (collectively, the "Burn Pits"), and the WRRTF Diesel Fuel Leak (WRRTF-13) (the "Fuel Leak").

Table 4-2. The WAG 1 sites that may pose an imminent and substantial endangerment to human health and the environment in the absence of remedial action.

OU	Site Code	Site Name
1-03	TSF-03	TSF Burn Pit
	WRRTF-01	WRRTF Burn Pits (I, II, III, and IV)
1-05	TSF-06, Area B	TAN/TSF-1 Area (Soil Area) ("Soil Contamination Area South of the Turntable")
	TSF-09	TSF Intermediate-Level (Radioactive) Waste Disposal System ("V-Tank")
	TSF-18	Contaminated Tank Southeast of Tank V-3 ("V-Tank")
	TSF-26	TSF PM-2A Tanks
1-06	TSF-07	TSF Disposal Pond
1-08	WRRTF-13	WRRTF Diesel Fuel Leak

5. SUMMARY OF SITE CHARACTERISTICS

Typically, Section 5 would describe the site characteristics; Section 6, the summary of site risks; Section 7, the description of alternatives considered; and so forth. However, because this investigation covered a wide variety of sites, the sections have been somewhat modified. Section 6 presents the overall baseline risk assessment (BRA) process and information. Site characteristics, remediation goals, remediation alternatives, and cost estimates are presented for each group of sites in Section 7 (the Tank sites), Section 8 (the Radionuclide-Contaminated Soil/Sediment sites), and Section 9 (the Nonradionuclide-Contaminated Soil/Sediment sites).

6. SUMMARY OF SITE RISKS

A BRA was conducted to evaluate the potential adverse health effects for both a current land-use scenario (occupational) and future land-use scenario (residential) to human and nonhuman receptors associated with exposure to chemical and radioactive substances detected in the soil. The BRA included a human health risk assessment (HHRA) and an ERA. The BRA used data from the RI and was based upon the nature and extent assumptions as discussed in the comprehensive RI/FS Report. Additionally, computer modeling was employed to estimate the exposure point concentrations for select exposure routes. Detailed information about the BRA can be found in Sections 6 and 7 of the comprehensive RI/FS. Table 6-1 of the RI/FS Report is a summary of the COPCs considered in the BRA.

6.1 Human Health Risk Assessment

The HHRA consisted of two broad phases of analysis: (1) site and contaminant screening that identified COPCs at retained sites and (2) exposure route analysis for each COPC. The exposure route analysis included an exposure assessment, toxicity assessment, and risk characterization. The OU 1-10 HHRA estimated human health risks associated with exposure to contaminants through soil ingestion, fugitive dust inhalation, volatile inhalation, external radiation exposure, groundwater ingestion, ingestion of homegrown produce, dermal absorption of groundwater, and inhalation of water vapors because of indoor water use.

6.1.1 Contaminant Identification

Historical sampling data were used to identify contaminants present in surface soils at the WAG 1 sites. The list of contaminants was screened based on a comparison with background concentrations for the INEEL, a concentration-toxicity screen, a risk-based concentration screen, no evidence determination that contaminant was released at the site, and whether the contaminant is routinely considered to be an essential nutrient. Because substances that are essential nutrients can be toxic at high concentrations, this screening applied only at sites where essential nutrient concentrations were less than 10 times the background concentration.

In addition, an evaluation of groundwater concentrations associated with the WRRTF-05 injection well was conducted and a comparison was performed to ensure that the detected concentrations would not exceed maximum contaminant levels (MCLs) or risk-based concentrations.

6.1.2 Exposure Assessment

The human health exposure assessment quantified the receptor intake of COPCs for select pathways. The assessment consisted of estimating the magnitude, frequency, duration, and exposure route of chemicals to humans.

6.1.2.1 Exposure Scenarios. Only those exposure pathways deemed to be complete, or where a plausible route of exposure can be demonstrated from the site to an individual, were quantitatively evaluated in the risk assessment. The populations at risk because of the waste exposures at TAN were identified by considering both the current and future land-use scenarios.

The residential scenarios model a person living on the site 350 days a year for 30 years, beginning in 2097 (100 years from 1997). The 100-year residential scenario was selected for analysis because the INEEL institutional controls are currently expected to last for at least 100 years. For purposes of the HHRA, the assumption was made that future residents will construct 3-m (10-ft) basements beneath their homes; therefore, they could be exposed to contaminants by the spreading of the excavated material around the perimeter of the house.

The occupational scenarios model nonintrusive daily industrial use without restrictions. The occupational scenarios were current and future. The current occupational scenario that was analyzed lasts for 25 years from the present. The future occupational scenario starts in 2097 (100 years from 1997) and lasts 25 years.

6.1.2.2 Quantification of Exposure. The following exposure pathways were considered applicable to the evaluation of human exposure to contaminants at the TAN sites: ingestion of soil, inhalation of fugitive dust, inhalation of volatiles, external radiation exposure, groundwater ingestion (residential scenario only), ingestion of homegrown produce (residential scenario only), dermal absorption of contaminants in groundwater (residential scenario only), and inhalation of volatiles from indoor use of groundwater (residential use only). Dermal absorption risks and hazard quotients (HQs) for organic contaminants contained in WAG 1 soils were calculated at all of the retained release sites evaluated in the HHRA. It was determined that dermal exposure did not contribute significantly to the risk based on these calculations and the knowledge that the predominant COPCs at TAN (i.e., radionuclides) are not dermally absorbed to any great extent.

Adult exposures were evaluated for all scenarios and pathways (external exposure, inhalation of dust, and ingestion of soil, groundwater, and foods); child exposures (0 to 6 years old) were considered separately only for the soils ingestion pathways in the residential scenarios. Children were included because children ingest more soil than adults, significantly increasing the exposure rate.

The exposure parameters used in the risk assessment were obtained from EPA and DOE guidance and are concurred upon by the Idaho Department of Health and Welfare (IDHW). The exposure parameter default values used in the risk assessment are designed to estimate the reasonable maximum exposure at a site. Use of this approach makes underestimation of the potential adverse health effects highly unlikely. The exposure parameters used in the risk assessment can be found in Section 6 of the RI/FS Report.

The contaminant exposure point concentrations evaluated in the HHRA were developed from site-specific sampling information. Ninety-five percent upper confidence level (UCL) of the mean concentrations were calculated from these sampling data, and either the 95% UCL or maximum detected concentration at a given site, was used as the exposure point concentration in the site's risk calculations. This analysis method was also designed to produce reasonable maximum exposure estimates for the WAG. Exposure concentrations associated with each COPC were estimated for groundwater, air, and soil.

The depths of contamination evaluated for the exposure routes discussed in the following sections, were based on guidance given in the *INEL Track-2 Investigation Manual* (INEL 1994). Specifically, contaminant concentrations were based on the 95% UCL on the mean concentrations (or maximum concentration if the maximum was less than the 95% UCL) of samples collected over the following depth ranges:

Depth	Exposure Route(s)
0 to 0.2 m (0 to 6 in.)	Occupational scenario: soil ingestion, inhalation of fugitive dust, inhalation of volatiles.
0 to 1.2 m (0 to 4 ft)	Occupational scenario: external radiation exposure.
0 to 3 m (0 to 10 ft)	Residential scenario: all soil pathway and air pathway exposure routes.
All sample results are included, regardless of depth.	Residential scenario: all groundwater pathway exposure routes.

In the exposure point concentration calculations, the only form of contaminant decay considered was radioactive decay (i.e., nonradionuclides are assumed to persist indefinitely in the environment). Radioactive decay was accounted for by estimating radionuclide concentrations at the start of a given exposure scenario, and then calculating the average concentrations that will exist during the length of the scenario. For example, the concentration of a given radionuclide analyzed in the current occupational exposure scenario is the average concentration that would exist between 0 and 25 years in the future, and the concentration analyzed in the 100-year future residential scenario is the concentration that would exist from 100 to 130 years. The effects of radioactive progeny were only considered by using "+D" slope factors in the radionuclide risk calculations (see Section 6.5 of the RI/FS Report). Decay and ingrowth calculations were not performed for complete radionuclide decay chains. The use of "+D" slope factors account for risks produced by daughter products that are in secular equilibrium with their parent radionuclides (EPA 1994).

6.1.3 Toxicity Assessment

A toxicity assessment was conducted to identify potential adverse effects to humans from contaminants at TAN. A toxicity value is the numerical expression of the substance dose-response relationship used in the risk assessment. Toxicity values (slope factors and reference doses) for the sites were obtained from EPA's "Integrated Risk Information System" database and EPA's "Health Effects Assessment Summary Tables: Annual FY-94." The toxicity values used in the BRA are presented in Appendix B of the RI/FS Report.

6.1.4 Human Health Risk Characterization

Excess lifetime cancer risks are estimated by multiplying the intake level, developed using the exposure assumptions, by the slope factor. An excess lifetime cancer risk of 1 in 1,000,000 (plausible upper bound) indicates that an individual has a one in one million chance of developing cancer over a lifetime as a result of site-related exposure to a carcinogen under the specific exposure conditions at a site. Excess cancer risks estimated below 1 in 1,000,000 typically indicate that "No Action" is appropriate. Risks estimated in the range of 1 in 10,000 to 1 in 1,000,000 indicate that further investigation or remediation may be needed, and risks estimated above the 1 in 10,000 typically indicate that further action is appropriate. However, the upper boundary of the risk range is not a discrete line at 1 in 10,000, although EPA generally uses 1 in 10,000 in making risk management decisions. A specific risk estimate around 1 in 10,000 may be considered acceptable if justified based on site-specific conditions. For the sites covered by this ROD, risks greater than 1 in 10,000 with a complete exposure pathway have been identified to require remedial action and sites with a risk greater than 1 in 10,000 that will decay to acceptable levels within the 100 years of DOE control of the INEEL, are classified as "No Further Action." Sites with risks less than or equal to 1 in 10,000 are "No Action" sites. "No Further Action" sites will require institutional controls for protection of human health. The sites requiring institutional controls, with additional information, are presented in Section 12 of this ROD.

The estimates of risks to human health are summarized in Sections 7, 8, and 9 of this ROD and presented in more detail in Appendix B of the RI/FS Report.

6.1.5 Human Health Risk Uncertainty

Many of the parameter uncertainty values used to calculate risks in the WAG 1 HHRA were uncertain. For example, limitations in site sampling produced some uncertainty associated with the extent of contamination at most of the WAG 1 sites. Limitations in the characterization of the WAG 1 physical environment produced some uncertainty associated with fate and transport properties of WAG 1 contaminants. To offset these uncertainties, parameter values were selected for use in the HHRA so that the results of risk assessment would present an upper bound, yet reasonable estimate of WAG 1 risks. Assumptions and supporting rationale, along with potential impacts on the uncertainty, are discussed in Section 6.6 of the RI/FS Report.

6.2 Ecological Risk Assessment

The ERA of WAG 1 was a qualitative evaluation of the potential effects of the sites on plants and animals, other than people, and domesticated species. A quantitative ERA is planned in conjunction with the INEEL-wide WAG 10 comprehensive RI/FS scheduled for 2002. This INEEL-wide ERA will provide an indication of the affect of INEEL releases in the ecology at a Site-wide level. There are no critical or sensitive habitats on or near TAN. Based on the present contaminant and ecological information and the qualitative ERA performed for this ROD, the remedies selected to address human health risks will serve to reduce the ecological risk posed at five sites where both human health and potential ecological risk have been identified. The need for remedial action will be reconsidered at these sites if the INEEL-wide ERA identifies an ecological risk.

6.2.1 Species of Concern

The only federally listed endangered species known to frequent the INEEL is the peregrine falcon. The bald eagle is known to frequent the INEEL; however, the status of the bald eagle in the lower 48 United States was changed from endangered to threatened in July 1995. Several other species observed on the INEEL are the focus of varying levels of concern by either federal or state agencies. Animal and avian species include the ferruginous hawk, northern goshawk, sharp-tailed grouse, loggerhead shrike, Townsend's big-eared bat, pygmy rabbit, gyrfalcon, boreal owl, flammulated owl, Swanson's hawk, merlin, and burrowing owl. Plant species classified as sensitive include Lemhi milkvetch, plains milkvetch, wing-seed evening primrose, nipple cactus, and oxytheca.

6.2.2 Exposure Assessment

Three primary media were identified to have the potential for posing risk to WAG 1 ecological components: (1) contaminated surface soil, (2) contaminated subsurface soil, and (3) contaminated surface water. Ingestion of contaminated groundwater was not considered because groundwater is not accessible to ecological receptors. For plants, the uptake of contaminants through the root systems was considered.

The amount of exposure is directly related to the amount of time spent and the fraction of diet taken on the sites. Therefore, exposures are greatest for permanent ecological residents, particularly plants and small burrowing animals. The small size of the sites of concern at WAG 1 is expected to minimize the exposures received by migratory species, which include most avian and large mammal species that inhabit the INEEL.

6.2.3 Ecological Risk Evaluation

A summary of the results of the ERA is presented in the RI/FS Report (Section 8). A basic assumption of the ERA was that, under a future-use scenario, the contamination is present at an abandoned site that will not be institutionally controlled. In actuality, co-located facilities are currently in use, and institutional controls will remain in place until they are decommissioned. Because these sites are at an industrial facility that is currently in use, they most likely do not contain desirable or valuable habitat. The absence of habitat and the existence of facility activities will minimize the exposure of ecological receptors.

6.2.4 Ecological Risk Uncertainty

Uncertainty is inherent in the risk process. Principal sources of uncertainty lie within the development of an exposure assessment. Uncertainties inherent in the exposure assessment are associated with estimation of receptor ingestion rates, selection of acceptable HQs, estimation of site usage, and estimation of plant uptake factors and bioaccumulation factors. Additional uncertainties are associated with the depiction of site characteristics, the determination of the nature and extent of contamination, and the derivation of threshold limit values. All of these uncertainties likely influence risk.

It is important to reiterate that it was anticipated that the conservative nature of the ERA at the WAG level would result in many sites and contaminants being indicative of potentially unacceptable risk to ecological receptors. This is due to the exposure calculations using a very conservative approach and is also compounded by the methods used to determine extent of contamination and characterize exposure concentrations at each release site.

Because of these considerations, the relative small size of the sites, and the conservatism of the ERA, no significant ecological impact is anticipated from these sites. The need for remedial action at sites posing a potentially unacceptable ecological risk at a population level will be reconsidered if the INEEL-wide WAG 10 ERA identifies an ecological risk.

6.2.5 INEEL-Wide Ecological Risk Assessment

The ecological hazard index numbers presented in Sections 7, 8, and 9 of this ROD are based on preliminary screening. A hazard index above 10 would require a remedial action decision by the WAG. However, a hazard index above 1 but less than 10 will be further evaluated in the WAG 10 comprehensive investigation and subsequent documentation. There were no sites with an ecological hazard index above 10 identified in the OU 1-10 RI/FS. Those sites with hazard indices greater than 1 (but less than 10) will be addressed by WAG 10.

6.3 Groundwater Fate and Transport

Waste Area Group 1 includes two potential sources of groundwater contamination: (1) contaminants injected into the aquifer by the TSF-05 Injection Well and (2) contaminants that could leach from surface and near surface soils. Groundwater contamination produced by the TSF-05 Injection Well was evaluated as part of the OU 1-07B action. Contamination that could leach into the SRPA from surface and near surface soil was evaluated in the OU 1-10 BRA (Section 6 of the RI/FS).

Contamination resulting from contaminants injected into the aquifer through the TSF-05 injection well is being addressed under the OU 1-07B groundwater remediation ROD. The OU 1-07B ROD was signed August 1995. According to that ROD, the contaminants of concern (COCs) in the TSF-05

contaminant plume are trichloroethylene, tetrachloroethylene, 1,2-dichloroethylene, Cs-137, H-3, Sr-90, and U-234. The selected remedy in that ROD will reduce the plume's trichloroethylene concentration to 5 μg/L, tetrachloroethylene to 5 μg/L, 1,2-dichloroethylene to 70 μg/L, Cs-137 to 119 pCi/L (proposed MCL), H-3 to 20,000 pCi/L (MCL), Sr-90 to 8 pCi/L (MCL), and U-234 to 30 pCi/L (proposed MCL) by the beginning of the 100-year residential scenario. The OU 1-10 BRA assumed that the OU 1-07B remediation will be successful. Therefore, only risks from the contaminants that could leach from the near surface soil were evaluated.

Groundwater concentrations resulting from surface and near surface sources were estimated in the BRA using the computer code GWSCREEN. The input parameters for the GWSCREEN model are presented in Appendix B of the RI/FS Report. Tables B-45 and B-46a in Appendix B of the RI/FS Report summarize the results of the GWSCREEN runs, and Appendix C of the RI/FS Report contains the GWSCREEN output files for each COPC. Because the retained site sources are combined for the GWSCREEN modeling, the output concentrations are not projected to occur at any specific point beneath WAG 1. The GWSCREEN results are assumed to be conservative estimates of the maximum groundwater concentrations that could hypothetically occur at any point beneath the WAG during the residential exposure scenario and do not exceed the 1 in 10,000 risk. In addition, groundwater concentrations are not expected to exceed MCLs based on the results of GWSCREEN results resulting from surface and near surface sources.

The contaminant concentrations calculated using GWSCREEN are expected to overestimate the true aquifer concentrations that will be produced by infiltration of contaminants at WAG 1. Because of the complexity of the subsurface beneath WAG 1 and limited information about factors that influence flow and transport of contaminants in groundwater, the uncertainty about potential contaminant concentrations associated with the groundwater pathway exposure routes is greater than the uncertainty associated with any other exposure pathway in the BRA. To compensate for this relatively large uncertainty, conservative assumptions are used throughout the groundwater pathway analysis. These assumptions can be found in Section 6.3.3.4 of the RI/FS Report.

The only source of perched water known to exist at WAG 1 lies beneath the TSF-07 Disposal Pond (see Section 4.1.10 of the RI/FS Report). The perched water body is present because of continuing water disposal in the TSF-07 Pond. These disposals will be discontinued before the end of the 100-year INEEL institutional control period. Once the water disposals are discontinued, the perched water body is expected to subsequently dissipate. Risks from ingestion of water taken from the TSF-07 perched water body were not calculated in the BRA for this reason. First, the water body is present as a result of water disposals to the TSF-07 Pond. It is unlikely that anyone will be able to drill a drinking water well into the perched water body. Second, the TSF-07 perched water body is relatively small, so it is unlikely that the body could produce enough water to support a residence over an extended period of time. Third, the TSF-07 Disposal Pond is permitted for land application of wastewater with the State of Idaho.

6.4 Basis for Response

Eight sites within OU 1-10 have actual or threatened releases of hazardous substances, which if not addressed, may pose an imminent and substantial endangerment to human health and the environment. The response actions selected in this ROD are designed to reduce the potential threats to human health and the environment. A summary of the release sites addressed in the OU 1-10 FS, including the eight remedial action sites, their COCs, range of detected concentrations, final remediation goals (FRGs), exposure pathways, risks, and hazard indices are listed in Table 6-1.

Table 6-1. Summary of release sites and COCs addressed in the OU 1-10 feasibility study.

Site Code	Description	COCs	Range of Detected Concentrations (mg/kg or pCi/g)	Final Remediation Goal for COC (mg/kg or pCi/g)	Exposure Pathway	Current Occupational Risks (Total/COC)	Future Occupational Risks (Total/COC)	Future Residential Risks (Total/COC)	Future Residential Hazard Index (Total/COC)
TSF-09/18	V-Tanks	Cs-137[a]	ND – 40148.94 ± 60	23.3	External radiation	9E-03/8E-03	8E-04/8E-04	4E-03/4E-03	1E+00/–[b]
TSF-26	PM-2A Tanks	Cs-137[a]	ND – 4400 ± 10.6	23.3	External radiation	1E-02/1E-02	1E-03/1E-03	2E-03/2E-03	1E+00/–[b]
TSF-06[C], Area B	Soil Contamination Area South of the Turntable	Cs-137	48.3 ± 3.49 – 150 ± 10.6	23.3	External radiation	1E-03/1E-03	1E-04/1E-04	3E-04/2E-04	1E+00/–[b]
TSF-07	Disposal Pond	Cs-137	0.0516 ± 0.01 – 135 ± 10	23.3	External radiation	1E-03/5E-04	1E-04/5E-05	8E-04/2E-04	3E+00/–[b]
WRRTF-01	WRRTF Burn Pits I, II, III, and IV	Lead[d]	3 – 2350	400[d]	Ingestion via soil	9E-07/–[e]	1E-07/–[e]	1E-04/–[e]	1E+00/–[f]
TSF-03	TSF Burn Pit	Lead[d]	23.4 – 2820	400[d]	Ingestion via soil	–[g]/–[e]	–[g]/–[e]	–[g]/–[e]	–[g]/–[g]
TSF-08	Mercury Spill Area	Mercury	0.4 – 73.7	1.9[h]	Ingestion via soil	8E-06/–[e]	8E-07/–[e]	1E-04/–[e]	3E+01/3E+01
WRRTF-13	WRRTF Fuel Leak	Total Petroleum Hydrocarbons	4.6 – 35700	–[i]	Ingestion via soil	–[g]/–[g]	–[g]/–[g]	–[g]/–[g]	–[g]/–[g]

ND = not detected

a. COCs identified were for soils surrounding tanks only. The tanks contain radionuclides, heavy metals, polychlorinated biphenyls and organic compounds. No risk assessment was performed for the tank contents because the tanks were not incorporated into these sites until the FS stage.

b. A hazard index was not calculated for Cs-137 because it is a carcinogen.

c. Estimated concentration using a portable NaI Scintillameter.

d. Additional COCs may be identified based on results of post-ROD sampling to support remedial action of the Burn Pits. The 400 mg/kg FRG for lead is based on EPA's residential screening level.

E. Risk is not calculated for lead or mercury because they are not carcinogens.

F. A hazard index was not calculated for lead because there is no toxicity information available.

G. Risk and a hazard index could not be calculated in the BRA because none of the site's COPCs have toxicity information available.

H. TSF-08 has been selected for a further treatability study under WAG 10.

I. To be determined during post-ROD sampling in accordance with the State of Idaho Risk-Based Corrective Action Guidance.

6.4.1 Remedial Action Objectives

The RAOs for OU 1-10 were developed in accordance with the NCP and CERCLA RI/FS Guidance. The RAOs were defined through discussions among the Agencies. The RAOs are based on the results of the HHRA and are specific to the COCs and exposure pathways developed for OU 1-10.

The RAOs for the soil pathway include:

- Reduce risk from external radiation exposure from Cs-137 to a total excess cancer risk of less than 1 in 10,000 for the hypothetical resident 100 years in the future and the current and future worker

- Prevent direct exposure to lead at concentrations over 400 mg/kg, the EPA residential screening level for lead

- Prevent exposure to petroleum hydrocarbon constituents in accordance with the State of Idaho Risk-Based Corrective Action (RBCA) Guidance.

The RAOs for the V-Tank and PM-2A Tank contents include:

- Prevent release to the environment of the V-Tank and PM-2A Tank contents.

To meet these RAOs, FRGs as identified in Table 6-1 were established. The objective of the FRGs are to ensure a risk-based protectiveness of human health and the environment by providing unrestricted land use in 100 years. These goals are quantitative cleanup levels based primarily on applicable or relevant and appropriate requirements (ARARs) and risk-based doses. The FRGs are used in the remedial action planning and assessment of effectiveness of remedial alternatives. Because the FRGs are both contaminant- and site-specific, the FRGs are presented for each site in Sections 7, 8, and 9.

6.4.2 Remedial Alternative Development

In accordance with Section 121 of CERCLA, the FS should identify remedial alternatives that achieve the stated RAOs, provide overall protection of human health and the environment, meet the ARARs, and are cost-effective. These alternatives, used individually or in combination, can satisfy the RAO through reduction of contaminant levels, volume or toxicity, or by isolation of contaminants from potential exposure and migration pathways.

In the RI/FS, treatment technologies for the eight retained release sites were identified and remedial alternatives (i.e., combinations of technologies) were developed for evaluation. Alternatives were developed for each of the contaminated media types and applied on a site-specific basis.

Details of the technologies considered and the alternative development process are included in Sections 10 and 11 of the RI/FS Report and in Sections 7, 8, and 9 of this ROD. The alternatives and combinations of alternatives were developed using experience from previous cleanups at other INEEL sites with similar characteristics. The NCP requires that a "No Action" alternative be evaluated as a baseline. However, because the "No Action" alternative would not meet the threshold criteria of compliance with ARARs and overall protection of human health and the environment, it was not considered further as a viable alternative.

6.4.2.1 Evaluation Criteria. The detailed analysis performed as part of the RI/FS provided an evaluation of candidate alternatives with respect to the nine evaluation criteria specified in 40 Code of Federal Regulations (CFR) 300.430(e)(9)(iii). The nine evaluation criteria are grouped in three categories: (1) threshold criteria that relate directly to statutory findings and must be satisfied by each selected alternative, (2) balancing criteria used to refine the selection of candidate alternatives for the site by evaluating their effectiveness, implementability, and cost, and (3) modifying criteria that measure the acceptability of the alternatives to state agencies and the community. The evaluation criteria are:

1. *Overall protection of human health and the environment* addresses whether a remedy provides adequate protection of human health and the environment, and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. *Compliance with ARARs* addresses whether a remedy will meet all of the ARARs under federal and state environmental laws and/or justifies a waiver.

3. *Long-term effectiveness and permanence* refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

4. *Reduction of toxicity, mobility, or volume through treatment* addresses the degree to which a remedy employs recycling or treatment that reduces the toxicity, mobility, or volume of the COCs, including how treatment is used to address the principal risks posed by the site.

5. *Short-term effectiveness* addresses any adverse impacts on human health and the environment that may be posed during the construction and implementation period, and the period of time needed to achieve cleanup goals.

6. *Implementability* addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. *Cost* includes estimated capital and operation costs, expressed as net present-worth costs.

8. *State acceptance* reflects aspects of the preferred alternative and other alternatives that the state favors or objects to and any specific comments regarding state ARARs or the proposed use of waivers.

9. *Community acceptance* summarizes the public's general response to the alternatives described in the Proposed Plan and in the RI/FS, based on public comments received.

These nine evaluation criteria form the basis for conducting the detailed analysis. The analysis presented sufficient information to allow the Agencies to select an appropriate remedy for each of the nine sites. Evaluation against the nine criteria is the basis for determining the ability of a remedial action alternative to satisfy CERCLA remedy selection requirements.

6.4.2.2 Detailed Analysis of Alternatives. The detailed analysis included an assessment of each alternative individually against each of the evaluation criteria. The evaluation criteria are addressed in terms of threshold, balancing, and modifying factors. Results of the individual analysis are then used in a comparative analysis identifying advantages and disadvantages of the alternatives relative to one another.